InGaP HBT Lift-Off for High Efficiency L-band T/R Module, Phase I

Completed Technology Project (2009 - 2009)

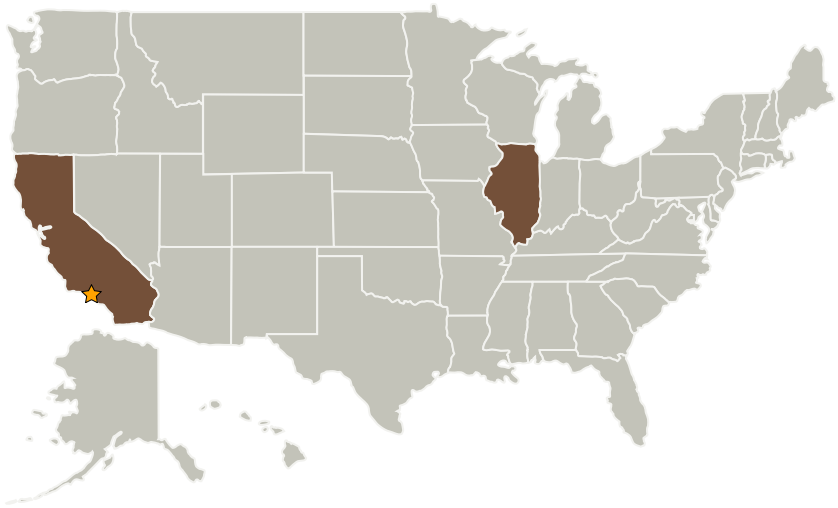
Project Introduction

This proposal addresses the need for the development of higher efficiency power amplifiers at L-band using GaAs HBT (heterojunction bipolar transistors) for pulsed mode radar applications. In this proposal we offer a novel approach for signifcantly improving the thermal characteristics of high power GaAs based HBTs. This work will be accomplished by the development of a high-yield, 4-inch epitaxial liftoff (ELO) technology accompanied by the bonding of the GaAs device wafer onto a diamond substrate. The power added efficiency is expected to be at least 65% with an improvement in power density by 50%.

Anticipated Benefits

The major potential application for L-band power amplifiers is in wireless communications. As the capabilities of wireless devices expand, there is an increasing need for compact, efficient power amplifiers. The proposed structures are an excellent technology platform for meeting this market demand for improved power amplifier performance at high efficiency levels and lower DC power consumption Radar remote sensing is a critical application of NASA's exploratory mission. Synthetic aperture radar can provide measurements to water cycle, global ecosystems, ocean circulation, and ice mass. L-band radar is particularly attractive for these applications. High efficiency, lightweight, and high reliability are key attributes for space-qualified components.

Primary U.S. Work Locations and Key Partners



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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
MicroLink Devices, Inc.	Supporting Organization	Industry Minority-Owned Business	Niles, Illinois

Primary U.S. Work Locations	
California	Illinois

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Celestino Jun Rosca

Principal Investigator:

Noren Pan

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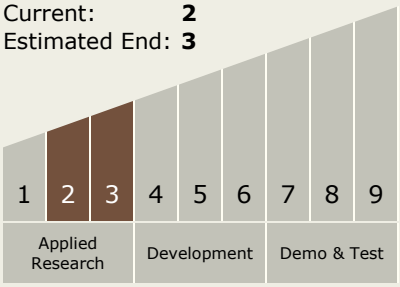
Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.2 Power-Efficiency